

irritation by scraping at the burning spot with the sting of the tail; but they seemed particularly careful not to sting themselves.

There seems, however, to be sufficient evidence to prove that some scorpions have been seen to sting themselves during the course of experiments of a nature similar to those described above. One observer indeed mentions, in the case of an Indian scorpion, that blood issued from the wound made by the sting—a piece of corroborative detail which enhances the probability of the accuracy of the observation. But it is *à priori* improbable that the scorpion has any intention of killing itself. It seems, however, not improbable that a random blow meant for an unseen enemy might accidentally strike and pierce the deliverer; or that when the irritation is localised, as in the cases of burning with a lens, acid, whisky,¹ or mustard, the scorpion, failing to remove the substance by the ordinary means of scraping with the tail, might thrust its sting into the spot affected, with the intention, not of killing itself, but of destroying the agent that is causing the pain. Or, indeed, it is conceivable that the mental faculties are so deranged by torture and the approach of death, that the scorpion does not recognise its own body by its sense of touch, and stings it as it would sting any other object within reach of its tail. If a blow inflicted in either of these ways were to pierce the brain, or were to seriously lacerate the great dorsal blood-vessel, it might, one can suppose, cause death of itself, independently of the burning.

So that if it be admitted that scorpions have sometimes killed themselves, our verdict, it would seem, must be—accidental suicide, or suicide while of unsound mind.

R. I. POOCK.

NOTES.

WE greatly regret to have to record the death of Dr. Charles Pritchard, F.R.S., Savilian Professor of Astronomy at Oxford. He died at Oxford on Sunday morning last in his eighty-fourth year. We hope to give on a future occasion some account of his career as a man of science.

THE gold medal of the Linnean Society has this year been awarded to Prof. Daniel Oliver, of Kew, to whom it was presented at the anniversary meeting of the Society held at Burlington House on the 24th inst.

A TABLET erected in Truro Cathedral to the memory of the late Prof. John Couch Adams was unveiled by the Bishop of Truro on Saturday last. Canon Mason, a companion of Prof. Adams at Cambridge, delivered an address, in which he spoke of the illustrious astronomer as "one of the greatest of Cornishmen." The tablet—the cost of which has been defrayed by public subscription—was designed by Mr. Pearson, R.A., and executed by Mr. Juleff, sculptor, of Cornwall. The Latin inscription, a translation of which will be placed near the tablet, is by the Archbishop of Canterbury.

THE new engineering and electrical laboratories at University College, Gower Street, were opened on Monday last by the Duke of Connaught. Many invited guests were present at the ceremony. Mr. J. E. Erichsen, the president of the college, in beginning the proceedings, said it was confidently anticipated that when the two laboratories which were about to be opened were fully equipped with mechanical appliances and electrical apparatus the college would possess every requirement for advanced research and thorough teaching. The cost would not fall far short of £20,000, and the council hoped that a liberal response would be made to the appeal for funds which had been issued, and especially that the great City Companies, which had

It is stated that in some parts of N. America scorpions sting themselves to death if a drop or two of whisky be placed upon their backs; and that from this manifestation of their dislike of alcohol, these animals are known to the natives as teetotallers.

done so much for education and were so deeply interested in the success of such an enterprise, would give their assistance. Engineering was all-important, not only from a scientific, but from a national point of view, and it was needless to dwell on the importance of increasing the opportunities of the youth of this country for the study of the wonderful science of electricity, which half a century ago was little more than a toy for the learned, but now, through the telegraph and the telephones, entered into the daily life of us all, and before which gas was, it would seem, destined to "pale its ineffectual fires" as an illuminant. It was to be hoped that such laboratories as these would lead to fresh scientific triumphs and further practical developments. The Duke of Connaught, before formally declaring the laboratories open, delivered a short address, in the course of which he said it had been his good fortune to see some of the greatest engineering works in different parts of the Empire, and he was certain that those who, like himself, had seen them would recognize the vast importance of a thorough study of the sciences on which they reposed. Foreign nations were competing with us on all sides, and if we were to maintain the proud position which we had hitherto held we should have to use every endeavour to increase the opportunities of study and of practical work. He trusted that the ceremony of to-day would mark a new era in the history of the college, and would tend to the prosperity and the increased power of engineering in this country.

THE death of Prof. Ernst Eduard Kummer is announced. He died at Berlin on May 14. Dr. Kummer was a Foreign Member of the Royal Society, and at the time of his death was in his eighty-fourth year.

A MEMOIR of the late F. A. Genth was read at a recent meeting of the Chemical Section of the Franklin Institute, and will be published in the June number of the Institute's Journal. It was prepared by a committee specially appointed for the purpose. Mr. Genth is described in the paper as one of the ablest mineralogists, and certainly the foremost mineral analyst, hitherto known in the United States. The writers also speak in high terms of his personal character, and of his remarkable power as a teacher.

MISS AGNES CRANE writes to us from Brighton with regard to an intimation she has just received from the "chief commissioner (Geology) of the Women's Auxiliary Branch of the World's Congress." It is to the effect that the last week in August has been set apart, for a short session during the day, for the presentation of specially-prepared geological papers by women. Such papers are not to exceed half an hour in reading. The co-operation of English workers in this science is invited, and an address to "geological women" will shortly be issued. The chief commissioner in geology is Mrs. Louisa F. Lowery, of 11, Gainsborough-street, Boston, Mass.

A GEOLOGICAL excursion to Dorking will be made by members of the Geologists' Association on Saturday, June 3, under the direction of Prof. Boulger and Mr. T. Leighton, the object being to examine the district described by the directors in a paper read before the Association on December 2, 1892. Arrangements for excursions on the remaining Saturdays of June have also been made.

THE following prize subjects have been recently announced by the Belgian Academy for 1894:—A. Mathematics and Physics. (1) Exposition and discussion of the various theories of diffusion of one liquid into another, with new facts bearing on this; (2) Estimate of theories explaining the constitution of solutions; new experiments throwing light on the subject, and especially on the existence of hydrates in aqueous solutions; (3) The investigations of modern geometers on the theory of the triple orthogonal system to be summarised and

extended in some important respect. B. Descriptive Sciences. (1) New researches on the intervention of phagocytosis in the development of invertebrates; (2) Description of the phosphate, sulphate, and carbonate minerals of the Belgian region, with indication of beds and localities; (3) New researches on the peripheral nerve-system of *Amphioxus*, and especially on the constitution and genesis of the sensitive roots; (4) New researches on the mechanism of cicatrization in plants. The prize in each case is a gold medal worth 600 francs. Further, the Jean Servais Stas prize of 1,000 francs is offered for new researches determining the (at present uncertain) atomic weight of one or several elements. Memoirs may be written in French or Flemish, and must be sent in, with motto, &c., before August 1, 1894. Only manuscripts are allowed.

At the time of our last issue an anticyclone from off the Atlantic was spreading over the south-west of this country, and caused a renewal of the drought in many places in the south and east of England, but in Scotland and the north of Ireland the conditions were less settled, and a moderate gale was experienced in the north of Scotland. The maximum day temperature ranged during the first part of the period from about 55° in some parts of the north to 74° in the extreme south, while the night minima were generally high for the season. During the early part of the present week the barometer continued high, but several small depressions formed over the south and east of England; cold northerly winds spread over the whole kingdom, accompanied by rain in many districts, and a decrease of several degrees in the temperature, the shade thermometer falling to the freezing point in the north of Scotland during the night of May 29. The *Weekly Weather Report* of May 27 showed that the temperature for that period was again above the mean, the average excess being from 3° to 5°. Rainfall was rather more than the mean in the north of Scotland, but less in all other districts. Bright sunshine was more prevalent over England and parts of Scotland than in the previous week; in most parts of England the percentage of possible duration was from 41 to 46, while in Ireland it was 19 to 20, and in the north of Scotland only 17 per cent.

DR. J. HANN has published in the *Sitzungsberichte* of the Vienna Academy of Sciences some of the results of the anemometrical observations made at the Meteorological Institute at that place from 1873 to 1892. The discussion, which occupies eighty octavo pages, is divided into three sections: (1) the daily period of absolute wind velocity (without regard to direction), (2) the yearly period of the velocity, and (3) the yearly period of the direction. In the two first sections a comparison of similar results for other stations, partly specially calculated for this purpose, has been made. The following are a very few of the results of Dr. Hann's valuable and elaborate work. The wind velocity shows a principal single daily period, with a minimum at 6h. a.m., and a maximum at 1h. p.m. Another secondary minimum is exhibited at 7h. 30m. p.m., and is followed by a secondary maximum at 10h. p.m. The cause of these secondary extremes is found to lie in the daily range of stormy winds; on calm days the secondary extremes disappear. The absolute mean maximum velocity occurs in March, about 14 miles per hour, and the minimum in October, about 10 miles per hour. There also appears to be a secondary maximum in November, and a secondary minimum in January, while from spring to summer there is again a slight increase in the velocity. With regard to direction, the northerly component has its maximum in March and its minimum in October, the easterly component has its maximum in April and minimum in July, the southerly component has also its maximum in April and its minimum in June and, lastly, the westerly component reaches a maximum in July and a minimum in February.

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THE Royal Observatory of Turin has recently published a work on the climate of that place, prepared by Dr. G. B. Rizzo, which is based on one of the longest series of observations extant. The monthly means and extremes of temperature and summaries of weather are given for 138 years (1753-1890), and the monthly means and extremes of atmospheric pressure for 104 years. The climate of Turin is of the Continental type, but is not very severe, as the mean difference between the hottest and coldest months is only 40°. The mean for January is 33°, and for July 73°; the mean of the annual minima is 13°, and the maxima 93°. The average number of days with rain and snow is 106, and the amount 33 inches. As this long series offers facilities for the investigation of secular variations, Dr. Rizzo has endeavoured to determine the periods of recurrence of hot and cold years. He finds that the observations do not support the period of thirty-five years quoted by Brückner, but that the hot and cold years succeed each other at intervals of about nineteen years. The causes which produce these variations are unknown, but they appear to depend upon local, rather than upon any extra-terrestrial conditions. The years of most rainfall are the coldest, but the series shows no sign of the climate changing, as some persons have imagined.

It is well known that the population of France is made up of many different elements, including, among others, Aquitanians, Ligurians, Gallic and Belgic peoples, Franks, Burgundians, and Norsemen. The Paris Society of Anthropology is strongly of opinion that much might be done to distinguish these various elements from one another, and has accordingly issued a circular in which it indicates to local observers the points about which information is wanted. These relate both to living persons and to human skeletons, or parts of skeletons, found in ancient monuments and elsewhere. Such remains, if there are no local buildings in which they can be placed, will be received by the Society and preserved in its museum.

M. A. DE MORTILLET contributes to the *Bulletins de la Société d'Anthropologie de Paris* (No. 1, 1893) an interesting note on Manx cats. He points out that the Isle of Man is not the only part of the world in which tailless cats are found. They are very common on the coasts of Japan, and have been cleverly represented by Japanese artists. M. de Mortillet suggests that Manx cats may be descended from specimens brought to the Isle of Man from Japan by sailors.

DURING a recent stay at Buitenzorg, in Java, Herr Haberlandt made some experiments in the Botanical Gardens there, on the transpiration of tropical plants. In general this was found considerably less than that of plants in Central Europe. Thus of seventeen tropical species, some with coarse, leather-like, others with tender, leaves, nine species transpired per day and per square decimeter surface less than 1 gramme; in six the amount was between 1 and 2 gr.; and in two only it reached 2.6 and 3.25 gr. Now, with European vegetables and woody plants it varies commonly between 2 and 5 gr., and sometimes reaches 6 or 7 gr. or more. This result the author considers a strong argument against the view that the transpiration current is of first importance in nutrition of land plants. These tropical plants, with their small transpiration, show extremely luxuriant vegetation, and are able, through osmotic forces, doubtless, to convey nutritive salts to their highest parts. It is curious that, spite of the great humidity of the air and the large amount of water in the ground, these plants often possess guards against too great transpiration, such as thick, cuticularised epidermis, deeply sunk stomata, and especially tissues adapted for storage of water. And the reason cannot lie, as sometimes at the coast, in the presence of salt in the ground. Herr Haberlandt finds an explanation in the fact that while he total transpiration is comparatively small, the hot sunny

forenoons may occasion large evaporation. The transpiration in a forenoon hour was, in general, four to twelve times that in an afternoon hour; sometimes as much as twenty or thirty times. The forenoon hours are by far the most favourable to assimilation, and it is most important to the plant that its turgescence be not then too much depressed, an end accomplished through those water reservoirs.

THE last issue of the memoirs of the Novorossian (Odessa) Society of Naturalists (vol. xvii. 3) consists of a very elaborate work in French, "Monographie des Turbellariés de la Mer Noire," by Dr. Sophie Pereyaslawzewa, ex-director of the Sebastopol Biological Station. The title of the work does not, however, exactly render its contents, as the author has not only given a monograph of forty-five species of Turbellariæ from the Black Sea, of which twenty-nine species and the genus, *Darwinia*, are new; she deals also with the anatomy and embryogeny of the Turbellariæ, and presents them in a new light. The striking likeness between a young *Acœla* and an Infusorian—she says—must probably be considered as the cause of the many errors committed as regards the Turbellariæ altogether. Various authors have differed immensely in their description of the *Acœla*; some have found in it no digestive cavity, others have denied the histological differentiation of the teguments; others, again, have denied the existence of a nervous system. It might have seemed that such instances would soon have been dissipated when carefully-prepared sections were resorted to; but the sections, made by different explorers, seemed to support the same views, as known from the works of Graeff and Goethe. Mrs. Pereyaslawzewa now maintains, and supports her affirmations by carefully-prepared sections, that the *Acœla* has a nervous system, almost simultaneously discovered by Metchnikoff, herself, and Delage, and demonstrates that it possesses also a pharynx and a digestive cavity; that its teguments are histologically differentiated, and that the name *Acœla* is not applicable to adult individuals, so that she has felt bound to change this name into *Pseudo-acœla*. This very elaborate monograph being published in French, it is accessible to all men of science. It is illustrated with sixteen well-printed plates, lithographed in Warsaw, from the author's own drawings.

It is known that certain plant-stuffs (alkaloids, tannin, oxalic acid, &c.) protect plants from attack by animals. This function, in the case of oxalic acid, has been recently studied by Herr Giessler (*Jenaische Zeits.*), taking species of *rumex*, *oxalis*, and *begonia*. The acid mostly occurs in the epidermis and peripheral tissues of the vegetative organs; parts underground have little or none. The leaves show most, but the acid may be found in the stem, and the leaf and flower stalks. Curiously, it does not, like other protective matters, appear in young organs. The older and more sappy the tissues, the more oxalic acid do they contain. Snails, which avoided those plants in the natural state, ate them when the oxalic acid had been precipitated. The substitution of various means of protection for one another was elucidated by Stahl; plants not protected mechanically have chemical protection, and *vice versa*. In the plants studied by Herr Giessler mechanical protection is deficient. Further, in organs that have little or no oxalic acid, is found tannin. These two "vicariate" with each other also in different species of a genus. In many tissues both occur together. The protective function of a secretion, lastly, does not exclude other functions. Thus, regarding the epidermis as a water-reservoir, the osmotically very active organic acids doubtless play an important part in the filling of the cells with water. The occurrence of *begonia* and *oxalis* species in very dry places, as also the deficiency in means of protection against transpiration, more pronounced the higher the quantity of acid, put this function of oxalic acid in a still clearer light.

PROF. SOLLAS, F.R.S., communicated a paper on the granophyre of the Carlingford and Morne mountains to a recent meeting of the Royal Irish Academy. The granophyre is everywhere intrusive into the gabbro, and owing to the contrasted character of the two rocks it is possible to trace out their relation in the fullest manner. The behaviour of the granophyre is of great interest; from wide dykes, comparatively few in number, it passes into innumerable thin lamellar injections, which seam the gabbro through and through. These can be further followed into cracks of microscopic minuteness, and these swell out at intervals into ganglia, which give a white spotted appearance to the otherwise almost black gabbro. The ganglia are granophyric infillings of what were once drusy cavities in the gabbro, and it is suggested that the quartz so frequently found in gabbro associated with granitic rocks, as *e.g.*, at Carrock Fell, is of a similar origin. Of equal interest is the abundance of gabbro fragments included in the granophyre, and since the mineral constituents of the gabbro present features peculiarly easy to recognise, there is no difficulty in following the changes which they have suffered in consequence of their immersion in the originally molten granophyre. Thus the Bytownite, which frequently occurs as phenocrysts in the granophyre, has frequently become surrounded by a marginal zone of orthoclase, and the diallage can be traced into amphibole and biotite and colourless granules of pyroxene, which either remain in clusters about their place of birth or are dispersed throughout the rock. It would, indeed, appear that the ferro-magnesian constituents of the granophyre which have led observers to designate it as syenite and augite granophyre are entirely derived from the gabbro, and it hence becomes an interesting question to consider whether in numerous other instances rocks intermediate in composition to the extremely acid and basic rocks with which they are associated may not also have arisen from the admixture of two already differentiated magmas, and not by the progressive modification of a single original magma.

At a recent exhibition by the French Société de Physique, MM. Macé de Lépinay and Perot showed a lecture-experiment illustrating well the phenomenon of mirage. A long vessel with plane sides contains a saline solution, on which is poured some distilled water. By diffusion, the liquids gradually mix and form a layer in which the density varies in a continuous way. If now a ray be sent, by means of a reflector, slightly upwards in the axis of the vessel, it describes a curve, passing through a maximum and descending. Its trace on a vertical plate of ground glass traversing the tube throughout its length, shows exactly the path taken, and gives a very pretty effect. On the same occasion, M. Pellin exhibited photographs of the fine gratings produced by Prof. Rowland, of Baltimore, whereby fine lecture experiments in diffraction can be produced at but small cost.

AN elegant method of optically studying the process of diffusion in liquids is described by Herr O. Wiener in *Wiedemann's Annalen*. It is somewhat similar to MM. de Lépinay and Perot's beautiful imitation of the mirage, and consists in sending a beam of parallel rays through a vessel containing two liquids of different density and refractive power. A trace of fluorescein makes the path of the rays visible, and shows that they are bent away from the less highly refracting liquid in the region where diffusion is taking place. By carefully pouring a layer of carbon bisulphide on to one of chloroform, and a layer of alcohol on the top of both, it is possible to make the beam describe a wavy path, due to alternate refractions by the alcohol and the chloroform, both of which are less highly refractive than carbon bisulphide. For the purpose of minutely investigating the process another arrangement is adopted. Parallel rays of monochromatic light are sent through

a slit at 45 degrees to the horizon, and pass through the diffusion vessel on to a screen. The dividing surface is indicated by a decided upward or downward bend of the line on the screen, which becomes gradually less pronounced and more evenly distributed as diffusion equalises the refractive indices. The amount of vertical displacement at each point of the curve measures the difference of concentration in the region traversed by the ray. The constant of diffusion can be calculated from the rate of change of the diffusion curve, and the displacement of the point of maximum bending indicates the lesser diffusivity of the liquid towards which it takes place. Herr Wiener has also successfully applied the method to the determination of the thermal conductivity of water by photographing the diffusion curve in various stages.

THE question as to whether there is a true hysteresis in the case of dielectrics has received considerable attention lately, and Arno, Hess, and Janet have published the results of extensive researches on this subject. A note by M. Charles Borel in the current number of the *Comptes Rendus* has some bearing on this point. He suspends a disc of paraffined paper by its centre in front of a plate which is charged, by means of a rotating commutator, alternately positively and negatively. The duration of the charge was 0.006 second, and between charges of opposite sign it was put to earth for equal intervals. When a glass rod is placed on one side of the disc, so that the plane of the disc and the axis of the rod are parallel to the lines of force of the field, and the end of the rod nearest the charged plate is slightly inclined towards the disc, the latter is rotated. This rotation can be explained by the mutual action of the residual charges in the disc and glass rod when the charged plate is earthed. Different specimens of glass produced very different results on the suspended disc, some having no effect whatever. The replacement of the disc of paraffined paper by one of mica had little effect, while discs of pure paraffin or ebonite showed only a feeble effect. It was found that rods formed of conductors or of good insulators, such as ebonite and shellac, produced a feeble rotation in the opposite direction to that produced by most dielectrics. If the rotation is really due to the residual electrification of the disc or rod this rotation in the inverse direction may be expected whenever the rod has no residual electrification. The effects of crystals held in different directions was tried, and it was found that, in general, the deflection varied with the direction of the crystal, which was normal to the charging plate.

Wiedemann's Annalen for May contains a paper by Herr J. von Geitler on the reflexion of electrical waves in wires. The waves were generated by means of the arrangement used by Blondlot, the secondary circuit being connected to two parallel wires 280 metres long. The variation of potential along these wires was measured by means of a differential electrometer, consisting of a double aluminium needle suspended by a quartz fibre before four metallic plates. These plates were connected, two and two, to the parts of the wire whose difference of potential had to be measured, in such a way that the attraction between the pairs of plates tended to turn the needle in opposite directions. The experiments show that if a series of electrical waves travel along two equal and uniform parallel wires there is a regular loss of phase and partial reflexion wherever the parallelism of the wires is destroyed, or wherever there is a change in the diameter of the wire. The same effect is produced by joining the plates of a condenser to the two wires at any point. The curves showing the connection between the electrometer throw and the length of a branch circuit attached to the main wires are of a very curious form, and owing to the loss of half a wave length at the reflexion at the end of the branch circuit in one case, the curve

obtained when the ends were separate was the exact inverse of that obtained when the ends were joined together.

MR. W. ROE contributes to the *Agricultural Journal*, of Cape Colony (April 6) an interesting paper on some of the disadvantages that may result from irrigation. Most water used for irrigation contains variable quantities of soluble salts, more especially soda salts, chlorides, and sulphates, not taken up largely by plants. Every application of water, therefore, adds to the saline ingredients of the soil—a very different effect from that of excess of rain water, which so far as there is open sub-soil for it to drain away would be likely to take out rather than add to the soluble salines in the soil. This mischief, accumulation of salts in the soil, is aggravated in a dry-air land where evaporation is great. The air, acting like a sponge on a surface, takes up the water, leaving the accumulated salts in the surface soil. But this surface soil is as the sponge to the layer beneath. Constantly after each water-leading the water is drawn to the surface, and evaporated, and its measure of salts left behind. Obviously the harm done by this accumulated salt will depend on the nature and quantity of the salines in the water used, as also upon the quantity of water applied. A good quality of river water may vary in having five to twelve grains to the gallon of soluble salts; more than this becomes risky, unless the sub-soil is very porous.

THE Rugby School Natural History Society has issued its report for the year 1892. The report, as the editor explains, differs from those of previous years in that the papers included in it deal solely with the natural history of the neighbourhood. They are all, with one exception, reprinted from the Rev. W. O. Wait's "Rugby, Past and Present," and as in the main they are written by old members of the Society, they may be regarded as presenting a kind of summary of the Society's work from its foundation to the present day.

A PAPER on the Siyin Chins, by Major F. M. Rundall, is included in the third volume of the "Supplementary Papers" of the Royal Geographical Society, and has also been printed separately. The author knows the Chin Hills well, and gives a very interesting account both of them and of the tribes by which they are inhabited. The paper is accompanied by a map.

THE new instalment of the proceedings of the Geologists' Association includes the presidential address of Prof. J. F. Blake, delivered on February 3. It deals with the basis of the classification of Ammonites.

AN essay on the laws of heredity, read originally by S. S. Buckman before the Cotteswold Field Club, has been translated into German, and issued as one of the series of "Darwinistische Schriften," published by Ernst Günther, of Leipzig. The German title of Mr. Buckman's work is "Vererbungsgesetze und ihre Anwendung auf den Menschen."

MESSRS. CROSBY, LOCKWOOD AND SON will issue in a few days an English edition of the "Handbook of the Steam Engine," by Herm. Haeder. The editor and translator of the English edition is Mr. H. H. P. Powles.

"A CONTRIBUTION to the Chemistry and Physiology of Foliage Leaves," by H. T. Brown, F.R.S., and Dr. G. H. Morris, has been reprinted, by Messrs. Harrison and Sons, from the "Journal of the Chemical Society," May, 1893.

THE Entomological Society of London has issued a catalogue of its library. The work has been edited by G. C. Champion, hon. librarian, assisted by R. McLachlan, F.R.S., and D. Sharp, F.R.S. Great additions to the collection have been made since the last printed catalogue was published in 1861; but there are still certain deficiencies, and Mr. Champion expresses a hope that some of these may be speedily supplied by Fellows, and that the publication of a separate Appendix may thus at no distant date be rendered necessary.

A COMPREHENSIVE study of the nature of the dissociation of hydriodic acid gas by heat, the conditions of equilibrium of the dissociated constituents, and the circumstances under which recombination occurs, has been made by Prof. Victor Meyer and Herr Bodenstein, and their results are contributed to the current number of the *Berichte*. The investigation was conducted upon similar lines to Prof. Meyer's recent experiments upon gaseous mixtures of hydrogen and oxygen, a series of a large number of equal-sized bulbs connected by capillary tubes being simultaneously filled with the pure gas and subsequently sealed and separated by fusion of the capillaries. In commencing the experiments Prof. Meyer was surprised to observe the comparative readiness with which gaseous iodine and hydrogen unite without the aid of platinum sponge or other condensing agents. If a glass tube containing a little iodine is filled with hydrogen, sealed, heated in a bath of the vapour of boiling sulphur, and after cooling opened under water, a considerable escape of pent-up hydriodic acid gas occurs, and the water immediately afterwards ascends in the tube owing to the absorption of the remainder. The hydriodic acid for the purpose of the experiments was all prepared by the direct union of the pure elements, inasmuch as the gas prepared by the usual method from iodide of phosphorus was always found to contain admixed volatile phosphorus compounds. The preparation was conducted by leading the mixture of iodine vapour and hydrogen over heated platinised asbestos, when it was found that 86 per cent. of the iodine entered into combination. The product, after passing through a suitable vessel in which the uncombined iodine was condensed, was received in cooled water, the gas regenerated by warming the fuming aqueous solution, and finally freed from moisture by leading it over phosphoric anhydride and from the last traces of free iodine by passing it over red phosphorus free from yellow phosphorus and lower oxides of phosphorus. The hydriodic acid gas thus obtained proved to contain no perceptible trace of impurity. Before proceeding to fill the bulbs the air was expelled from them by means of a current of pure hydrogen, which was allowed to pass through them for 24 hours, with occasional heating to near the softening point of the glass in order to remove the film of condensed air adhering to the surface of the glass. The hydrogen was finally displaced by pure hydriodic acid and the bulbs sealed. These extreme precautions, which were adopted in order to secure a number of specimens of pure hydriodic acid, afford a striking example of the infinite pains which are required to effect the final settlement of many of the apparently simple problems of elementary chemistry.

PROF. MEYER has definitely decided the question of the action of light upon pure hydriodic acid gas. Bulbs exposed upon the roof of the Heidelberg laboratory during the summer months became filled in a few days with large brilliant crystals of iodine. After ten days' exposure 58 per cent. of the gas had been dissociated, and at the end of the summer 99 per cent., or practically all. The fact that the waves of light are so active in effecting dissociation rendered it imperative that the thermal experiments should be conducted in the dark. The whole of the above experiments in connection with the preparation of the gas and the filling of the bulbs were therefore conducted in a dark room. The thermal results may be very briefly summarised. The statement in text-books that hydriodic acid commences to dissociate at 180° is incorrect. It is only in presence of admixed air that this occurs. At 310° the decomposition of the pure gas is so slight that it would take 2,000 hours to attain the point of maximum dissociation at which equilibrium is established. This point was determined indirectly to be attained when 0.1669 of the original quantity of gas was dissociated. At the temperature of the vapour of boiling mercury (350°) equilibrium was found directly to be estab-

lished when 0.1731 was decomposed. At 394° (boiling retene) 0.1957 was dissociated, and at the temperature (448°) of boiling sulphur 0.2150. It is of particular interest to learn that Prof. Meyer has further proved by direct experiment that the formation of hydriodic acid from gaseous hydrogen and iodine proceeds at any temperature until exactly the same condition of equilibrium is attained as in the corresponding dissociation experiment. Thus when the synthesis of hydriodic acid was conducted at the temperature of sulphur vapour the reaction proceeded until only 0.21 of the elementary gases remained uncombined, the same amount as was dissociated when starting with the compound gas. Perhaps the most interesting result of the investigation is that concerning the rapidity of the dissociation. It has been found that whenever two bulbs of equal size are heated for equal lengths of time precisely the same amount of decomposition or of formation occurs. The reaction is thus found to proceed with strict regularity, the amount of dissociation or of synthesis at any fixed temperature being a direct function of the time, and capable of expression by a simple mathematical formula which is given in the memoir and which is amply verified by a large number of experiments.

NOTES from the Marine Biological Station, Plymouth.—Last week's captures include the Mollusca *Eulima distorta* and *Rostanga coecinea*, the Isopoda *Anthura gracilis* and *Munna Kröyeri*, and the Brachyura *Eurynome aspera* and *Portunus marmoreus*. The gelatinous alga, which has been so abundant in the townetings since the beginning of April, has at length almost completely disappeared. Swarms of the Leptomedusæ *Irene pellucida* (half-grown) and *Obelia lucifera* (full-grown and mature) have repeatedly been taken; but for some weeks past an occasional specimen of *Corymorpha nutans* has been the only representative of the Anthomedusæ. A single large *Bipinnaria* larva has been observed. On the shore young individuals of this year's growth of the Nemertines *Amphiporus lactifloreus* and *Lineus obscurus* (= *gesserensis*), and of the Crustacean *Carcinus menas* are now plentiful. The following animals are now breeding:—Several *Terebellidae*, the Opisthobranch *Philine aperta*; the Crustacea *Virbius varians*, *Portunus marmoreus*, *Stenorhynchus phalangium* and *tenuirostris*.

THE additions to the Zoological Society's Gardens during the past week include a Common Hedgehog (*Erinaceus europæus*, white var.) from Berkshire, presented by Mr. R. T. Hermon-Hodge; a Ruddy Ichneumon (*Herpestes smithi*) from India, presented by Mr. Maurice Welsh; a Guillemot (*Lomvia troile*) British, presented by Mr. H. B. Hewetson, F.Z.S.; two Ringhals Snakes (*Sepedon hæmacheles*) from South Africa, presented by the Rev. G. H. R. Fisk, C.M.Z.S.; an Aurora Snake (*Lamprophis aurora*) from South Africa, presented by Mr. T. E. Goodall; a Levaillant's Amazon (*Chrysotis levaillanti*) from Mexico, a Grey Parrot (*Psittacus erithacus*) from West Africa, a Cardinal Grosbeak (*Cardinalis virginianus*), a Rose-breasted Grosbeak (*Hedymeles ludovicianus*) from North America, deposited; a Jaguar (*Felis onca*, ♀) from South America, two Striped Hyænas (*Hynna striata*, ♂ ♀) from North Africa, a Black-necked Swan (*Cygnus nigricollis*, ♂) from Antarctic America, twelve Green Lizards (*Lacerta viridis*) South European, purchased.

OUR ASTRONOMICAL COLUMN.

THE ECLIPSE OF APRIL, 1893.—M. Bigourdan communicates to *Comptes Rendus* for May 23 (No. 21) a brief preliminary account of his observations made during this total eclipse of the sun. The station he occupied was Joal (approximately Longitude 1h. 16m. 38s. E. of Paris, and Latitude 14° 9' 25" N.)